

themselves that is made; the subsequent sunrise has no urgent interest for them; but in Egypt and Britain the stars were simply the heralds of the greater luminary for which the religious sacrifice had to be prepared by the priests.

The method of making the determination is as follows:—The surrounding terrestrial phenomena suggest the approach of the dry season, and two men are then sent into the jungle—which probably means any open space with a clear horizon—to await the celestial sign. After watching for a few nights, may be a month, the Pleiades are seen on the horizon just before the light of the rising sun overcomes that of the stars. Then the messenger-astronomers return to their village and announce the fact, and the work on the forest is commenced. Should the tribe have been so misled by the workings of terrestrial nature as to delay the making of the observation until Orion's belt rises before daylight, it means that they must work "double-shift" in order to get their ground cleared in time for the vegetable matter to dry thoroughly ere the season for burning it comes round. After this recognition of the season the interest of the tribe in celestial phenomena becomes dormant until the services of the latter are again required. Not until the Pleiades reach the zenith before sunrise do they consider it advisable to set fire to the refuse, for unless the latter has had enough time to dry thoroughly it will not be completely consumed, and the ground will be of no use for rice-growing.

With the neighbouring tribes, the Kenyahs and the Kayans, the method of determining the seasons is rather more scientific, exhibiting an advanced state of knowledge. These people are acquainted with the various phenomena attending the apparent diurnal and annual movements of the sun. They know that the noon shadow is the shortest, and that it always lies in the same straight line, sometimes to the north, sometimes to the south. Consequently, they utilise this knowledge by measuring either the length of the shadow cast by a gnomon set up vertically on levelled ground, or else the length of a beam of sunlight projected through a small hole in the roof of a hut upon a plank, laid horizontally on the floor by packing it up until round discs will not roll when placed on edge on its surface. The shadow, or beam of light, is measured by means of a stick, on which there are a series of notches. The distance of each notch from the end of the stick represents the length of shadow which experience, tinged, maybe, with superstition, has taught these people to recognise as favourable, or the reverse, for the prosecution of their various agricultural operations. The stick, known as "asa do," is carefully preserved in the keeping of an older member of the tribe, duly elected to this office on account of his superior wisdom and his incapacity for more strenuous manual labour, and it is he who watches that the beam is not measured obliquely, and announces the advent of the favourable season for sowing operations to commence.

A striking phase of the question, showing how limited is the original knowledge, possibly appears in the selection of the Pleiades and Orion's belt as the "warners." Why should these two groups be selected by so many different tribes in so many widely separated ages? A plausible explanation seems to be that their forms are instantly recognisable. Whilst the aboriginal watcher would probably not be able to recognise the isolated, though bright, stars of the large constellations, especially if, as is the case with the Dyaks, no azimuth marks were employed, he could not possibly confuse either of these with any other group of stars.

WILLIAM E. ROLSTON.

THE FOURTH INTERNATIONAL ORNITHOLOGICAL CONGRESS.

THE International Ornithological Congress assembled in London on Monday, June 12, under the presidency of Dr. R. Bowdler Sharpe, and continued in session to the end of the week. The congress was instituted at Vienna in 1887 under the patronage of the Crown Prince Rudolph of Austria. The second congress was held at Buda-Pesth, and the third at Paris in 1901, so that the London congress was the fourth of the series. It was well attended by both British and foreign ornithologists—to the number of rather more than 300. They commenced their work on June 12 by an informal meeting at the Imperial Institute, South Kensington, which was the headquarters of the congress during its session.

The British ornithologists were well represented by Dr. Hartert, of Tring, and Mr. Bonhote, of Cambridge, who acted most efficiently as secretaries, while Mr. C. E. Fagan, of the British Museum, looked after the finances as treasurer. These gentlemen were assisted in their duties by Dr. Godman, Mr. Meade-Waldo, Mr. Ogilvie-Grant, Dr. Penrose, the Hon. Walter Rothschild, Dr. Sclater, and Mr. Witherby, who were all members of the organising committee. Many other well known British ornithologists attended the meetings, such as Sir Walter Buller, Dr. Butler, Mr. Dresser, Colonel Godwin-Austen, Mr. Harting, Mr. Pearson, Mr. Pycraft, Mr. Howard Saunders, and Mr. D. Seth-Smith. The French ornithologists were represented by Dr. Oustalet and Dr. Burcau, the German by Graf Hans v. Berlepsch, Dr. Blasius, and Prof. Reichenow, the Dutch by Dr. Büttikofer and Baron Snouckaert van Schaumburg, the Austrian by Dr. Lorenz and Dr. Reiser, and the Italian by Dr. Giglioli and Count Arrigoni degli Oddi. From America came Mr. F. M. Chapman and Dr. Stejneger, from Switzerland Prof. Fatio and Dr. Studer, from Russia Dr. Bianchi and Baron Loudon, from Bulgaria Dr. Paul Leverkühn, from Canada Mr. Fleming, from Hungary Dr. Herman, and from Belgium Dr. A. Dubois, all names well known in ornithological science.

The first general meeting of the congress took place in the morning of June 13, when Dr. Oustalet, the last president, gave up the chair to Dr. Bowdler Sharpe, the new president, who delivered a most instructive address on the origin and progress of the great national bird-collection in the British Museum, which is under his charge. The meeting was then divided into five sections:—(1) systematic ornithology and distribution; (2) migration; (3) biology and oology; (4) economic ornithology; and (5) aviculture, which sat at stated periods throughout the week. To the first section, which was presided over by Dr. P. L. Sclater, F.R.S., about fourteen communications were made, among which were papers by Graf v. Berlepsch on new neotropical birds, by Mr. Pycraft on the importance of the study of nestling birds, which was illustrated by various pregnant instances of the secrets they have already revealed and are likely to betray in the future, and by Padre Schmitz on the birds of Madeira. In this section also, Dr. Reiser, of Serajevo, exhibited the series of North-Brazilian birds which had been obtained during Dr. Steindachner's recent expedition to the Rio St. Francisco, and Mr. Walter Rothschild showed his unique copy of "Les Voyages de Sieur B.," with the map attached, which contains much information on the now extinct birds of the Mascarene Islands.

In the second section, which met on Tuesday and Saturday, with Dr. Herman, of Buda-Pesth, in the chair, Mr. J. H. Fleming gave particulars of an unusual migratory visit of Brunnich's murre to the

interior of Canada, and Dr. Helm brought forward some new observations on the migration of the starling in Germany.

The third section, for biology, nidification and oology, was presided over by Dr. Victor Fatio, of Geneva, and received communications from the Rev. C. R. Jourdain on erythrism in eggs, and from Dr. R. Blasius on the bird-life of the Pyrenees. In this section also, Mr. Frank M. Chapman, of New York, delighted his audience by his vivid description of the breeding-places of the scarlet flamingo and brown pelican in the Bahamas, which he had lately visited, and by his excellent photographic illustrations of these birds and their nests.

Mr. H. E. Dresser took the presidential chair in the fourth section, which was devoted to economic ornithology and the protection of birds, and was well attended. Papers were read here by Dr. Herman on his recent observations on the constituents of the food of birds, by Sir John Cockburn on the legislation that had taken place in Australia for the preservation of bird-life, and by Mr. T. Digby-Pigott on the present state of the laws on the same subject in Great Britain and Ireland, which seem to require careful revision. Mr. Frank E. Lemon, secretary of the Royal Society for the Protection of Birds, also lectured on the same subject.

In section five (aviculture) the communications were not so numerous, but Mr. D. Seth-Smith, the editor of the *Avicultural Journal*, did not omit to urge the importance of his special branch of ornithology as an aid to scientific study, which, indeed, is now generally admitted.

Besides the sections, general meetings were held on the Wednesday and Friday, at which various ornithological topics of general interest were discussed. Papers were read by Dr. Paul Leverkühn, of Sophia, on the breeding-places of the vultures and eagles in the Balkans, by Dr. Herman on the state of ornithology in Hungary and on the theory of the migration of birds and its origin, and by Mr. J. L. Bonhote on the hybridisation of ducks; while Mr. W. S. Bruce gave an interesting account of the ornithological results of the Scottish Antarctic Expedition which are now being worked out. Besides these papers, Dr. Edward Wilson gave an excellent lecture on the birds obtained and observed in the Antarctic seas and lands during the recent National Antarctic Expedition, and showed off the manners and customs of the penguins in a long series of photographs.

Thursday, June 15, was entirely devoted to a visit to the great zoological museum at Tring, of which the birds (under the curatorship of Dr. Hartert) form one of the most prominent features. It is needless to say that the ornithologists were most hospitably received and entertained by Mr. Walter Rothschild, who further delighted the visitors by a lecture on birds extinct or likely soon to become so, one of his pet subjects of study. This lecture was illustrated by the exhibition of a splendid series of specimens of the birds in question, for which the Tring Museum is celebrated, and by numerous drawings collected from every quarter whence information on this subject could be obtained.

At the final meeting, held on Saturday, June 17, it was agreed that the next assemblage of the International Ornithological Congress should take place in 1910 in Germany, with Dr. Reichenow, of Berlin, as president, and Dr. R. Blasius and Graf Hans von Berlepsch as vice-presidents. It was hoped that the meeting would be held at Berlin, but the president and vice-presidents were authorised to select any other city in Germany as the place of assemblage in case

they should find it more expedient to do so. It was also agreed, on the motion of Mr. Walter Rothschild, to send telegrams to the Governments of Tasmania and New Zealand requesting them to interfere with the destruction of the penguins in the Antarctic islands now carried on in order to obtain the small quantity of oil which is contained in the bodies of these unfortunate birds.

THE THAMES FLOW AND BRITISH PRESSURE AND RAINFALL CHANGES.

DURING the years 1903 and 1904 there appeared two reports dealing with the flow of the Thames in relation to the rainfall of the river's basin, the first being published by the London County Council and the second by the Thames Conservators. The material dealt with extended over the period 1883 to 1903, and the very close association between rainfall and flow was clearly brought out.

In a recent communication to the Royal Society by Sir Norman Lockyer and the writer, an attempt has been made to discuss data from the year 1860 up to the present time, involving not only statistics of rain-

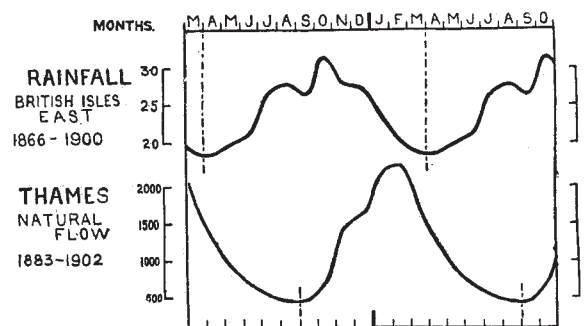


FIG. 1.—The curve representing the mean annual variation of the Thames flow lags five months behind that of the mean annual rainfall of the British Isles.

fall over a wider area than that dealt with in the above mentioned inquiries, but changes of barometric pressure in Great Britain and certain distant areas.

In consequence of the fact that the British annual variation of rainfall is at a minimum in about April and a maximum in about October, the rainfall observations have been grouped into twelve months extending from April to the following March, both months inclusive. The annual variation of the river flow (see Fig. 1) for similar reasons necessitated a different grouping of the twelve months; in this case the year was taken to cover the period September to the following August, both months inclusive. The flow of the river will thus be seen to lag five months behind the rainfall.

In the following curves here reproduced the rainfall for each group of twelve months (April to March) is compared directly with the river flow for the twelve months commencing in September of the same year.

Re-computing the rainfall and river statistics, published in the above mentioned reports, according to these new divisions of the year, the changes from year to year can be seen in Fig. 2 (curves iii. and iv. continuous lines). To investigate variation in the river flow previous to 1883, an application to the Thames Conservators resulted in securing original data which have enabled the curve to be traced back to the year 1860 (Fig. 2, curve iii., dotted portion). As a check on the whole of this curve another series of gauge readings was similarly treated, and these are shown in curve ii. The synchronous variations in